CITY OF NAPLES
PURCHASING DIVISION
CITY HALL, 735 8TH STREET SOUTH
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ADDENDUM NUMBER 1

NOTIFICATION DATE:	SOLICITATION TITLE:	SOLICITATION NUMBER:	BID OPENING DATE & TIME:
5/14/2020	Naples Pier Corrosion Mitigation - ITB	20-037	5/21/2020 2:00PM

THE FOLLOWING INFORMATION IS HEREBY INCORPORATED INTO, AND MADE AN OFFICIAL PART OF THE ABOVE REFERENCED BID.

The following answers to written submitted questions:

1. Will the City of Naples require a building permit and the coastal construction setback line permit for this project?

ANSWER: A building permit is required but there is no coastal setback permit required.

2. On page 37 of the bid package - 9. Galvanic jackets ; 9.1 See Specification 16651 Lifejacket Galvanic Jacket….. Our question is where is the specification section 16651?

ANSWER: Please reference Exhibit A.

3. Will a Laydown Area near the pier be provided?

ANSWER: Yes, a small local laydown area will be provided on the pavers near the roundabout approximately 10ft x 20ft. Contractor will be responsible for protecting the pavers, construction fencing and screening (per City Code). A larger area can be provided at a City Laydown area for bulk material storage.

4. Are the Bid tabulation quantities based on general areas and not individual repair areas?

ANSWER: Bid tabulation quantities is based on the individual repair areas at the time of inspection. The units coincide with the tables located on sheet G102.

5. Is the Vector Galvashield DAS Jacket an acceptable alternative to the LifeJacket (attached)?

ANSWER: Yes, the Galvashield is an acceptable alternative to the LifeJacket system. We ask that the Contractor identify their experience with the submitted manufacture with their bid.

6. Can the EOR provide a copy of the Specification 16651 Lifejacket Galvanic Jacket?

ANSWER: Please reference Exhibit A.

7. What is the Grout Mix Design required for the pile jackets?

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ANSWER: The grout mix is included in Specification 16651.

8. Will the pier remain open and accessible to the public during construction?

ANSWER: The pier will remain open during construction if it has been re-opened from the COVID-19 closure.

9. Is the contractor responsible to install barriers in water to prevent the public from accessing work areas?

ANSWER: The contractor is responsible for maintaining a safe work area throughout construction.

10. Are Golf Carts with non-marking tires allowed on the pier to transport material?

ANSWER: Yes, but contractor will be responsible to restore any marks left on the IPE decking.

11. Are we required to have a Florida Contractor's License? We do have a Louisiana General Contractor's license in Heavy Marine Construction.

ANSWER: Yes, you are required to be a Florida Licensed Contractor.

12. From the pre-bid meeting held May 7th, are there any "minutes" available?

ANSWER: No.

13. Also, can I get a list of the attendees?

ANSWER: The information you requested can be found on the City website at https://www.naplesgov.com/rfps.

14. Are there any subsequent Addendums; Is the Opening date still 5/21/2020? I've gotta say, someone put together a nice bid package with drawings that are self-explanatory. I look forward to working with your team.

ANSWER: Yes, all City of Naples bid documents and addendums are posted to the city website and as a courtesy are sent to Demand Star, which is a separate bidding service that can be accessed for a fee and is not affiliated with the City of Naples. Yes, bid opening date has not changed.

15. In regards to the above project. Can the reference questionnaire be provided by the apparent 2 low bidders? Currently a lot of municipalities and other owners are working with a skeleton staff and getting information that isn't crucial to an ongoing project is slow and they may not see this as detrimental to their work.

ANSWER: No.

16. At the jacket installation locations identified along the beach (Bents 9, 10, & 13), what is the intended installation procedure for the bulk anode assembly? May these be buried below the water line in the sand, or does the pile need to be excavated to attach the bulk anode to the pile per the detail?

ANSWER: These jackets are designed to be smaller at only 6ft in length. The contractor is expected to install the jacket at full length and if excavation is needed to bury the anode below the sand they shall include that in their pricing. Means and methods for installation are up to the Contractor and will only be reviewed by the EOR.

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17. As direct measurements could not be obtained during the site visit, could the dimensions from bent to bent centerline, the width of the pile cap bent, and the approximate height of the deck above water (MLW) be provided?

ANSWER: The bents are approximately 15ft O.C. +/- 6", the existing bents are approximately 18" wide and 16" tall, and the existing pier decking is approximately +11ft NAVD +/- which would result is approximately 12.5ft +/- from MLW.

18. May the contractor rely on the intended July thru September working window in preparing its bid? Are there other restrictions on the working dates, such as on holidays?

ANSWER: Yes, on working July- September, no working in the City on Holidays.

19. Would it be permissible to include reasonable Inclement Weather Preparedness costs based on historical weather data for the project area, and thereby limit contractor's risk of cost escalation related to an abnormal weather dist year?

ANSWER: Rain days are permitted- if we give contractor 60 days from NTP and it rains for 10 days straight the timeline is extended 10 days as agreed upon by City project manager and contractor.

20. Will the jacket installation require oversight from a NACE-certified inspector?

ANSWER: The City's EOR has a NACE CP Specialist that will be reviewing the installation on behalf of the City per specification 16651.

21. Is the designed weight capacity of the pier's top deck known? Are there restrictions relating to the weight of equipment or materials (PSF or axle weight) that may be stored on top of the pier that are more restrictive than the design capacity?

ANSWER: The pier is designed to 100PSF live load.

22. May the successful bidder utilize a portion of the pier's topside deck for staging? If so, what easement must be maintained for pedestrian access to the pier?

ANSWER: Yes, a small local laydown area will be provided on the pavers near the roundabout approximately 10ft x 20ft. Contractor will be responsible for protecting the pavers, construction fencing and screening (per City Code). A larger area can be provided at a City Laydown area for bulk material storage.

23. Are there potable water connections and/or electrical outlets on the pier that may be used by the contractor?

ANSWER: Yes- potable water on site can be utilized by contractor.

24. Please clarify for purposes of an example whether the Chair Repair photo shown on page C200 of the drawings depicts one or two chair repair locations.

ANSWER: That photo shows (2) chair repairs.

25. Please clarify the units and quantities shown for Mob/Demob on the Bid Tabulation Sheet.

ANSWER: "The priority work is the Jacket Installation which is presented as Phase 1, any additional funds available will be used for bug/patch/chair repairs if possible. If all the work can't be done then the remaining work may be contracted in a separate budget cycle (year) and warrant a separate mobilization. The Phase 2 mobilization is to show Council the potential savings if all the work is done under one contract.

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26. Contractor's cost to perform Galvanic Jacket install varies depending on the install location (beach or in-water). If the work scope increases or decreases, the unit price will not accurately reflect the cost to perform. Should the contractor split Bid Tabulation Item 6 to reflect these two different install locations?

ANSWER: The contractor should bid the unit rate as outlined in the SOV.

Exhibit A - SPECIFICATION SECTION 16651 - GALVANIC CATHODIC PROTECTION JACKET SYSTEM

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SECTION 16651 – GALVANIC CATHODIC PROTECTION JACKET SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Related Sections include the following:

1. Drawings- ESE Iso and Scope and Structural Lifejacket Assembly

2. Section 3734 Repair of Spalled Concrete

3. Section 3738 Crack Repair

1.02 SUMMARY

A. The work under this section consists of supplying, installing and energizing a sacrificial galvanic anode cathodic protection jacket system, including connection to the steel, materials, testing, and ensuring continuity between all embedded steel components on designated structural components, and all required quality control and quality assurance.

1. The cathodic protection jacket system consists of continuous sheets of expanded zinc mesh anodes attached directly to the inside surface of the fiberglass reinforced plastic (FRP) integral jacket.

2. This “System” is to be installed at the locations indicated on the plans and as directed by the Engineer of Record (EOR).

B. Minor Pile Repairs Outside Jacket Limits: The Contractor shall also restore to original dimensions minor concrete delaminations and/or spalls on the structure that may be present (above MLW line) outside the limits of the jacket, or as designated by the Engineer.

1.03 REFERENCE STANDARDS

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

C. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references (latest editions):

1. American Concrete Institute (ACI):

a. ACI 211.1, Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete

b. ACI 301, Specifications for Structural Concrete

2. American Society for Testing and Materials (ASTM):

a. ASTM B69, Standard Specification for Rolled Zinc

b. ASTM B418, Standard Specification for Cast and Wrought Galvanic Zinc Anodes

c. ASTM C143, Standard Test Method for Slump of Hydraulic Cement Concrete

d. ASTM C150, Standard Specification for Portland Cement

e. ASTM C231, Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

f. ASTM C260, Standard Specification for Air-Entraining Admixtures for Concrete

g. ASTM C494, Standard Specification for Chemical Admixtures for Concrete

h. ASTM D570, Standard Test Method for Water Absorption of Plastics

i. ASTM D638, Standard Test Method for Tensile Properties of Plastics

j. ASTM D790, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

k. ASTM D4812, Standard Test Method for Unnotched Cantilever Beam Impact Resistance of Plastics

l. ASTM D2583, Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor

1.04 QUALITY ASSURANCE

A. Cathodic Protection Specialist: The City has secured the services of a Cathodic Protection Specialist accredited by NACE International with a minimum of five years of experience in the field of cathodic protection on concrete. The CP Specialist, or the technician under his direction, shall supervise the overall installation including participation with the Contractor in designing the construction sequence, performing random site visits to oversee every phase of the work. Additionally, the CP Specialist, or the technician under his direction, shall be responsible for all the continuity testing, testing all the continuity corrections, and performing the initial energizing on all piles including: current, static, and energized potential measurements. The CP Specialist, or the technician under his direction, shall also check for shorts between the anode and the steel and notify the Contractor for correction as necessary prior to placing any jackets. Testing for shorts will be done before and after the filling materials are set. The CP Specialist's NACE certification shall be shared with the Contractor prior to commencement.

B. Quality Control: The Contractor shall submit a quality control plan for approval prior to commencing the jacket installation. Prior to commencing any work, the Contractor shall determine the scope and sequence of work so that the appropriate measures are taken to ensure proper quality control throughout the project.

C. Certification Statement: the CP Specialist shall sign the following statement, and shall submit the original copy to the Engineer after completion of the project.

1. "I hereby certify that the cathodic protection jacket systems constructed under (project number) have been completed to the point where the systems are functionally complete. I further certify that construction on these systems has preceded substantially in accordance with the contract plans and specifications or that any deviations, which are noted below, will not prevent the system from functioning in compliance with the intent of the contract when properly operated and maintained. These determinations have been based upon on-site observation of construction, scheduled and conducted by me or by a representative under my direct supervision, for the purpose of determining if the work proceeded in compliance with the contract documents."

1.05 SUBMITTALS

A. Contractor's Quality Control Plan

B. Contractor's Debris Containment Plan

C. Contractor's Spall Repair Log (repair quantities)

D. Shop Drawings: Prior to commencing the cathodic protection jacket installation, the Contractor shall submit for approval shop drawings indicating equipment, materials, and the procedures for installing the jacket. Include details on the following:

1. Negative connections to the reinforcing steel,

2. Continuity check and correction procedures,

3. Mean high and low water elevations,

4. Anode system fabrication, and

5. Anode system positioning relative to water elevations.

E. Product Data for Jacket System:

1. FRP Jacket

2. Zinc mesh and bulk anode

3. Concrete fill material:

a. Cement and aggregate certifications

b. Mix design

F. Cathodic Protection Specialist qualifications

G. Cathodic Protection Specialist certification statement

H. Commissioning Report

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle materials according to the manufacturer's recommendations and in such a manner as to prevent damage to materials and structure.

1. Store packaged materials on elevated platform and protect from weather, moisture, condensation, and neglect.

2. Store packaged materials unopened until ready to use.

3. Zinc anodes shall be stored in dry conditions in the original unopened containers in a manner to avoid exposure to extremes of temperature and humidity.

B. Deliver materials to the site in the manufacturer's original and unopened containers, clearly labeled with the manufacturer's name and type of products.

PART 2 - PRODUCTS

2.01 GENERAL

A. The Contractor shall use only approved materials from approved sources and shall furnish material certifications to the Engineer of Record for approval prior to placing any materials. Alternative materials must meet or exceed the specified requirements and be tested by a certified, third party testing laboratory.

B. Material certifications must be supplied and approved before commencing any work. Materials not meeting the specifications herein will be rejected for re-submittal. The "System" must be installed according to specification and in accordance to the Manufacturer's recommended procedures.

2.02 CATHODIC PROTECTION JACKET SYSTEM

A. The jacket "System" shall consist of stay-in-place fiberglass forms provided with a zinc mesh anode pre-installed against the inside surface in a continuous expanded metal sheet and filled with an approved sand-cement mortar or structural concrete (4000 psi minimum).

1. Fiberglass Forms: The inside-face of the form shall have no bond inhibiting agents in contact with the cement grout or mesh anode. The forms shall be provided with nonmetallic bolt stand-offs which will maintain the forms in the required position. Assembly and jacket preparation shall be completed at the factory before delivery to the job site. The forms shall be properly sealed in the field to provide a positive seal of the annular space between the concrete component and the form.

a. Form Material: The material furnished for the FRP jacket forms must meet the following physical property requirements:

1) Water Absorption (ASTM D570) – 1% max.

2) Ultimate Tensile Strength (ASTM D638)* - 15,000 psi min.

3) Flexural Strength (ASTM D790)* - 25,000 psi min.

4) Flexural Modulus of Elasticity (ASTM D790) – 700 ksi min.

5) IZOD Impact (ASTM D4812) – 15 ft-lb/inch min. (unnotched)

6) Barcol Hardness (ASTM D2583) – 45 min.

* On original specimen whose flat surfaces are not machined to disturb fiberglass.

b. Fiberglass thickness: minimum wall thickness shall be 1/8 inch for non-structural jackets and 3/16 inch for structural jackets.

2. Zinc Mesh Anode: The zinc mesh anode attached inside the jacket shall be continuous sheets of expanded zinc mesh placed in direct contact with the face of the fiberglass jacket and conforming to special A-190 zinc alloy and certified in accordance with ASTM B 69.

a. The zinc mesh must be tested and meet the following chemical composition (chemical analysis to be provided with the material submittals).

1) Pb 0.003% wt. max.

2) Fe 0.001% wt. max.

3) Cd 0.001% wt. max.

4) Al 0.001% wt. max.

5) Ti 0.001% wt. max

6) Cu 0.7 - 0.9% wt. range

7) Zn balance

b. Additionally, the mesh anode shall have the following physical properties:

1) Electrical conductivity = 28% min.

2) Solid zinc density = 0.28 lb / cu. in.

3) Weight of expanded zinc mesh = 1.60 lb/ sq. ft. min.

4) Average open area = 53%

5) Solid sheet thickness = 0.90 inch

c. The expanded zinc mesh anode shall also conform to the following nominal geometry to allow proper mortar encapsulation:

1) 0.500 inch hex pattern

2) 0.125 inch strand width SWD

3) 0.563 inch strand bond width LWD

4) 0.313 inch short opening

5) 0.750 inch long opening

3. Bulk Anode: Minimum 48-pound bulk zinc anode

a. Anode material: ASTM B418 (99% pure zinc)

b. Associated mounting and connection hardware

1) 2” hot-dipped galvanized channel (cut to length and predrilled),

2) Carriage bolts, nuts and washers.

3) No. 4 AWG copper strand lead wire with HMWPE insulation brazed to a 3/8” diameter steel rod and potted in an 8” long by 1 1/4” diameter epoxy filled CPVC section for protecting the wire splice.

B. Connection Wires: The expanded mesh anode shall be provided with a connection wire for each jacket section and be long enough to make the appropriate connections for the system operation. Connection wires shall either be directly wired to the steel reinforcement within the jacket area, or be routed to a terminal junction box mounted outside the jacket limits and as determined by the EOR.

C. Fill Material

1. The concrete fill material shall consist of a mixture of portland cement, aggregate, water and approved admixture. The mix shall not contain fly ash, slag, silica fume or corrosion inhibiting admixtures.

a. Cement: ASTM C150, Type I or II

b. Fine and coarse aggregates: ASTM C33 Class 4M, normal-weight, natural or manufactured sand and gravel or crushed stone.

1) Aggregate particles shall be clean, hard, tough, durable, of uniform quality, and free from soft, thin elongated pieces, disintegrated stone, dirt, organic, or other injurious materials occurring either free or as coating.

2) Aggregates must be supplied from a single source approved by the Engineer and with a documented record of at least ten years of satisfactory service using similar aggregates and cementitious materials in similar applications and service conditions.

3) Concrete aggregates shall be deemed innocuous (non-reactive).

4) Fine aggregate gradation shall conform to ASTM C33 Section 6.1.

5) Coarse aggregate gradation shall conform to Table 2 of ASTM C33.

a) Nominal Maximum Size: 3/8 inch

c. Admixtures:

1) General: Admixtures shall not contain calcium chloride.

2) Air-Entraining Admixture: ASTM C260

3) Water-Reducing Admixture: ASTM C494, Type A

4) High-Range, Water Reducing Admixture: ATM C494, Type F

5) Water-Reducing and Accelerating Admixture: ASTM C494, Type E

6) Water-Reducing and Retarding Admixture: ASTM C494, Type D

d. Mixing water: clean and free of injurious quantities of substances known to be harmful to portland cement and meeting the requirements of ASTM C94.

2. Mixture proportioning:

a. Prepare design mixture proportions for each type and strength of concrete determined by either laboratory trial mixtures or field-test databases, according to ACI 301 and in accordance with ACI 211.1 and this specification.

b. Compressive Strength: 4,000 psi minimum at 28 days as determined by ASTM C39

c. Air Content: NA

d. Slump-flow: 24 to 26 inches as determined by ASTM C1611. Concrete shall not show visible signs of segregation at maximum flow.

e. Chloride content: Water-soluble chloride ion content contributed from constituents including water, aggregates, cementitious materials, and admixtures as determined by ASTM C1218 for each concrete mixture at age between 28 and 42 days shall not exceed 0.08% by mass of cement.

D. Terminal Box: The terminal box shall measure 4 inch by 4 inch by 4 inch minimum, or other suitable size with weather tight cover and shall be attached to the mounting surface using a minimum of four fasteners.

1. All PVC components shall be Schedule 80, UV resistant.

2. All hardware for installation of the PVC conduit and terminal box shall be Type 316 stainless steel.

3. A 0.1-ohm shunt shall be placed inside the terminal box and wires for measuring the current shall be routed to two, ¼ inch diameter stainless steel bolts that shall extend outside the terminal box

PART 3 - EXECUTION

3.01 GENERAL

A. The Contractor shall be responsible for the repair or replacement of any damaged private or public property resulting from his/her operation. Any testing required to assign responsibility of damage shall be secured by the Contractor at no cost to the Owner.

3.02 PREPARATION

A. Inspection: The Contractor shall inspect all concrete components and clearly mark deteriorated areas; including hollow sounded areas that are to receive the jacket “System”. All areas shall be sound tested by the Contractor to determine the actual dimensions of the deteriorated concrete to be removed. Each jacket should encompass the entire problem area within the specified jacket limits. The Engineer reserves the right to modify the jacket system to address confined areas, or areas inaccessible for normal jacket installation. Dimensions of the spalled areas shall be recorded by the Contractor and verified by the Engineer. A final report detailing locations and size of the spalls and/or cracks shall be provided by the Contractor at the end of the project. Remove all delaminated, cracked or unsound concrete from the areas, which are hollow sounding when tested, or areas with visible cracks (up to 0.015 inch wide) may not need to be removed as directed by the Engineer.

B. Jacket Location and Limits: The jacket “System” shall be installed on the designated concrete components starting and terminating at the elevations detailed in the construction plans. Adjustments to these elevations may be required to encompass areas that may have obstructions, or other requirements to achieve adequate protection and repair. The Contractor shall field verify all jacket requirements prior to placing any orders.

3.03 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with manufacturer's published recommendations.

C. Concrete Surface and Reinforcement Preparation: Surface preparation shall include the removal of all loose or delaminated concrete. All reinforcing steel shall be maintained at original position and all exposed steel shall be sandblasted or hydro-blasted clean to a gray metal condition prior to concrete placement.

D. Concrete Removal: Spalled concrete removal and clean-up is considered incidental to the jacket installation. Care shall be exercised as to contain falling debris from entering into the water. Debris includes but is not limited to scrap metal, demolition debris, concrete and concrete dust, zinc, etc. A containment plan shall be submitted by the Contractor for approval by the Engineer prior to commencing any work.

E. Continuity: Continuity of reinforcement including prestressing steel, reinforcing bars, dowel bars, and spiral ties, shall be provided by resistance welding or other approved method. This is accomplished by joining two separate solid, mild steel wires to all discontinuous steel elements until the complete steel matrix is continuous with itself. The Contractor shall submit details of the intended method for this operation and materials specifications for approval by the Engineer.

1. Prior to installing the jacket, the CP Specialist or technician, shall perform an electrical continuity test between all strands, spiral ties, and dowel bars (if present) on all concrete components receiving cathodic protection. The CP Specialist shall certify such tests correct and a detailed report shall be provided to the Engineer at the end of the project.

2. Strands and dowels for continuity test shall be exposed by drilling a ¾ inch diameter hole to each strand and/or dowel in the concrete, or by saw cutting a trench exposing the steel reinforcement. Special care shall be observed to avoid cutting any of the existing reinforcing steel during the drilling or saw cutting operation.

   a. Concrete excavations to expose the spiral tie shall be performed inside the jacket limits. Dimensions of the excavation shall be kept to a minimum but not exceed 4 inch by 4 inch. Routing wires outside the excavation to the conduit system shall be performed inside the jacket conduit attached to the terminal box. The Contractor shall verify continuity between the connections and the spiral tie prior to coating with epoxy.

   b. If using the saw-cut method; stagger the elevation on each pile face within the jacket limits. Using existing exposed steel for continuity testing when possible. Some additional chipping may be necessary to expose the stands and/or dowels. Where continuity correction is required, additional concrete excavation will be necessary. Size of continuity correction excavation shall be maintained at the minimum required to expose the discontinuous to a continuous adjacent strand as shown in the construction plans or advised by the Engineer. Continuity shall then be provided to all strands inside the groove.

3. Repair any discontinuous steel at no extra cost. Provide continuity by resistance welding two continuous solid steel wires to each strand requiring continuity correction inside the excavation. Re-test continuity on all strands after this operation is completed. All welds shall be approved satisfactory by the Engineer, appointed inspector or CP Specialist before coating with epoxy. Continuity welds shall receive a coat of 100% solids, non-conductive epoxy such that no welded wire shall be in contact with the concrete when patching. Intended resistance welding equipment and procedure shall be included and submitted for approval in the shop drawings prior to performing this work.

4. After connection is approved, the excavation shall be filled with an approved mortar prior to the jacket installation.

F. Negative Connections (to steel reinforcement): The Contractor shall install an electrical negative connection on each concrete element receiving cathodic protection. This location shall be maintained constant at locations unless otherwise approved by the Engineer and the CP Specialist. Connections shall be one of the following methods:

a. The connection shall be performed by brazing two No. 10 AWG THWN copper strand wires to different areas of the steel reinforcement at the elevation shown in the construction drawings. A sufficient length of wire shall be used such that the wires can be routed to the terminal box mounted on the pile without any splices. The wire shall be brazed to a minimum length of the spiral tie of 1 inch. The brazed part of the negative connection wire (at the spiral ties) shall receive a coat of 100% solids, non-conductive epoxy such that no wire or brazing material will be in contact with the concrete when patching.

b. Soldered electrical ring connectors shall be used for the connection. Connection between the ring connectors shall be made using 316 stainless steel bolts, nuts and washers. The connection shall be properly insulated after completion. Wire splices and connections insulating method and materials shall be submitted to the Engineer for approval prior to performing this work.

c. Alternate method submitted and approved by CP Specialist and Engineer.

G. Terminal Box: The terminal box shall be placed at a convenient location for testing and in an area less likely to see damage. The elevation of the terminal box shall be maintained constant throughout the project where possible for similar elements.

H. Forms: Jackets shall be equipped with staged pumping ports at specific locations to assure good concrete placement and provide a void-free fill annulus.

1. All joints need to be sealed for a grout-tight seal prior to placing any of the fill material.

2. Upon placing the forms around the concrete components; they should be grout-tight and capable of maintaining their shape without assistance or damage. Jacket stand-offs may require field fabrication after removal of unsound concrete to assure proper alignment of the jacket during fill material placement.

I. Placement: Filling material shall not be dropped into the form from elevations greater than six feet. Filling material for jackets extending below water level shall be pumped from the bottom upward using the staged pumping ports. The pumping process shall continue after initial filling until no water is present at the highest discharge point of the jacket and a uniform grout consistency is achieved.

J. Curing: After the filling material has cured for a minimum 72 hours, all temporary form support and/or bracing shall be removed from the FRP jackets and the exterior of the jackets shall be cleaned of any filling material which may have been deposited.

3.04 COMMISSIONING

A. Commissioning the System: The CP Specialist shall submit a report to the Engineer detailing: continuity testing and correction, anode to steel resistance, initial current, and static and energized on and off potentials for each test station on the concrete components being protected. The commissioning report and the Contractor's spall size log shall be submitted to the Engineer at the completion of the project.

END OF SECTION 16651